Listing of Claims

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Previously presented) A homogenous process for the hydrogenation of dicarboxylic acids and/or derivatives thereof with an amine in the presence of a catalyst comprising:

(a) ruthenium or osmium; and

(b) an organic phosphine;

and wherein the hydrogenation is carried out in the presence of water.

2. (Original) A homogenous process according to Claim 1 wherein the water is present in at least 1% by weight.

3. (Previously presented) A homogenous process according to Claim 1 wherein the dicarboxylic acid and/or derivative thereof is selected from one or more of dicarboxylic acids, polycarboxylic acids, anhydrides, monoesters or diester of dicarboxylic acids, monoamides or diamides of dicarboxylic acids, salts, such as amine salts, of dicarboxylic acids or mixtures

4. (Previously presented) A homogenous process according to Claim 1 wherein the dicarboxylic acid and/or derivative thereof is a C_4 to C_{12} dicarboxylic acid.

5. (Previously presented) A homogenous process according to Claim 1 wherein the dicarboxylic acid and/or derivative thereof is saturated or unsaturated.

6. (Previously presented) A homogenous process according to Claim 1 wherein the dicarboxylic acid and/or derivative thereof is selected from maleic acid, fumaric acid, succinic acid, maleic anhydride, adipic acid, and succinic anhydride.

7. (Currently amended) A homogenous process according to Claim 1 wherein the amine is $NR^1R^2R^3$ where R^1, R^2 and R^3 are each hydrogen or alkyl and at least one of R^1, R^2 and R^3 is alkyl.

8. (Original) A homogenous process according to Claim 7 wherein the alkyl group is a C_1 to C_6 alkyl group.

9. (Original) A homogenous process according to Claim 8 wherein the alkyl group is methyl, ethyl or propyl.

10. (Previously presented) A homogenous process according to Claim 1 wherein the amine is mixed with the dicarboxylic acid and/or derivatives thereof prior to undergoing the process.

11. (Currently amended) A homogenous process according to Claim 1 wherein the dicarboxylic acid and/or derivative thereof is converted to ~~the~~ a corresponding amide by reaction with the amine prior to commencement of the hydrogenation.

12. (Previously presented) A homogenous process according to Claim 1 wherein the water is present as the solvent for the reaction.

13. (Previously presented) A homogenous process according to Claim 1 wherein one or both of the reactants or the product of the reaction are the solvent.

14. (Previously presented) A homogenous process according to Claim 1 wherein a solvent is used and water is present as an additive in the solvent.

15. (Original) A homogenous process according to Claim 14 wherein the solvent is selected from tetraethyleneglycol dimethyl ether, N-methyl pyrrolidone, diethyl ether, ethyleneglycol dimethylether, dioxane, 2-propanol, 2-butanol, secondary alcohols, tertiary alcohols, lactams and N-methyl caprolactam.

16. (Previously presented) A homogenous process according to Claim 1 wherein the water is produced in situ as a by-product of the hydrogenation reaction.

17. (Previously presented) A homogenous process according to Claim 1 wherein the catalyst comprises ruthenium and the ruthenium is provided as a ruthenium compound.

18. (Original) A homogenous process according to Claim 17 wherein the ruthenium compound is a compound selected from nitrates, sulphates, carboxylates, beta diketones, or carbonyls.

19. (Currently amended) A homogenous process according to Claim 1 wherein the ruthenium is present in an amount of from ~~0.0001 to 5 mol, preferably~~ 0.005 to 1 mol, as ruthenium per liter of reaction solution.

20. (Previously presented) A homogenous process according to Claim 1 wherein the phosphine is a tridentate phosphine.

21. (Previously presented) A homogenous process according to Claim 1 wherein the phosphine is selected from trialkylphosphines, dialkylphosphines, monoalkylphosphines, triarylphosphines, diarylphosphines, monoarylphosphines, diarylmonoalkyl phosphines and dialkylmonoaryl phosphines.

22. (Previously presented) A homogenous process according to Claim 21 wherein the phosphine is selected from tris-1,1,1-(diphenylphosphinomethyl)methane,

tris-1,1,1-(diphenylphosphinomethyl)[[-]]ethane,
tris-1,1,1-(diphenylphosphinomethyl)propane,
tris-1,1,1-(diphenylphosphinomethyl)butane,
tris-1,1,1-(diphenylphosphinomethyl)2,2-dimethylpropane,
tris-1,3,5-(diphenylphosphino[[-]]methyl)cyclohexane,
tris-1,1,1-(dicyclohexylphosphinomethyl)[[-]]ethane,
tris-1,1,1-(dimethylphosphinomethyl)ethane,
tris-1,1,1-(diethylphosphino[[-]]methyl)ethane,
1,5,9-triethyl-1,5,9-triphosphacyclododecane,
1,5,9-triphenyl-1,5,9-triphosphacyclododecane,
bis(2-diphenylphosphinoethyl)phenylphosphine,
bis-1,2-(diphenyl phosphino)ethane,
bis-1,3-(diphenyl phosphino)propane,
bis-1,4-(diphenyl phosphino)butane,
bis-1,2-(dimethyl phosphino)ethane,
bis-1,3-(diethyl phosphino)propane,
bis-1,4-(dicyclohexyl phosphino)butane,
tricyclohexylphosphine, trioctylphosphine,
trimethyl phosphine, tripyridyl phosphine and
triphenylphosphine.

23. (Original) A homogenous process according to Claim 21

wherein the phosphine is selected from tris-1,1,1-(diarylphosphinomethyl)alkane and tris-1,1,1-(dialkylphosphinomethyl)alkane.

24. (Previously presented) A homogenous process according to Claim 1 wherein the catalyst is preformed.

25. (Previously presented) A homogenous process according to Claim 1 wherein the phosphine compound is present in an amount of from 0.0001 to 5 mol per liter of reaction solution.

26. (Previously presented) A homogenous process according to Claim 1 wherein the hydrogenation is carried out at temperatures from about 190°C to about 300°C.

27. (Previously presented) A homogenous process according to Claim 1 wherein the reaction pressure is from about 500 psig to about 2000 psig.

28 (Previously presented) A homogenous process according to Claim 1 wherein the ratio of the amine to the dicarboxylic acid or derivative thereof is from about 0.5:1 to about 100:1.

29. (Previously presented) A homogenous process according to Claim 1 wherein the ratio of the amine to the dicarboxylic acid or derivative thereof is from about 0.9:1 to about 2.0:1.

30. (Previously presented) A homogenous process according to Claim 1 wherein the product is a 2-pyrrolidone or an N-alkylated version thereof and the dicarboxylic acid or derivative thereof is maleic acid, maleic anhydride, succinic acid or succinic anhydride.

31. (Previously presented) A homogenous process according to Claim 1 wherein the product is caprolactam and the dicarboxylic acid or derivative thereof is adipic acid.

32. (Previously presented) A homogenous process according to Claim 1 wherein the catalyst is regenerated in the presence of the water and hydrogen.